

## Letter to the Editor: "Errors Involving Pediatric Patients Receiving Chemotherapy: A Literature Review"

I am writing in response to the article by Trinkle and Wu [1] regarding errors in administering chemotherapy to children. In this overview of medication errors (and in other reports), it is concluded that exposure to intrathecal vincristine is uniformly fatal in children [1–4]. While this has been the outcome for most patients, a recent report is notable for its documentation of survival of such a patient after aggressive and prompt intervention [5]. This patient survived intrathecal vincristine because of two important factors: the use of aggressive, multifaceted rescue therapy and the immediate institution of these therapies. The approach taken in this case is outlined below.

Within 5 min of the accidental injection of intrathecal vincristine, a large gauge spinal needle was inserted into the lumbar space. After allowing the cerebrospinal fluid (CSF) to freely drain, 3 CSF exchanges were performed with 50 cc aliquots of proteinated, preservative-free lactated Ringer's (LR) solution (25 ml fresh frozen plasma/LR). Within 2 hr a ventriculostomy catheter was placed, a lumbar drain was inserted, and continuous ventriculolumbar lavage of the CSF space was begun with the same protein solution. Within 12 hr the patient was started on glutamic acid, 10 g IV over 24 hr, then 250 mg po q 8 hr, pyridoxine 50 mg IV q 8 hr, and folinic acid 25 mg IV q 6 hr. Although this patient developed subsequent paraplegia, he has only minimal weakness of the upper extremities and a normal mental status.

In conclusion, exposure to intrathecal vincristine is not uniformly fatal. A potentially useful approach to minimizing the sequelae of such an accident is available. The recommended approach to this devastating accident is primarily prevention. A number of precautions should be part of every clinic's practice, including allowing only experienced personnel to deliver chemotherapy; physically removing IV chemotherapy from the procedure room where intrathecal injections are given; completely labeling each syringe with patient's name, medication dose, and route of administration; and having rescue protocols available for use in the event of a catastrophic chemotherapy error.

The manufacturer of vincristine (Eli Lilly, Indianapolis, IN) has a great deal of anecdotal information available that may be of help in the event of a poisoning [6]. If the poisoning is not discovered for many hours, rescue therapy is probably futile.

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### Reply

We thank Dr. Walter for bringing attention to this case report [1]. Unfortunately, it had not been indexed in MEDLINE before our manuscript was submitted.

We agree wholeheartedly with Dr. Walter's remarks about the need to institute immediate and aggressive rescue measures, primarily drug removal, in the event of the intrathecal injection of a vinca alkaloid. We also note with great interest that the method of drug removal described is what we suggested in our review: CSF exchange using RL with added protein, until ventriculolumbar perfusion (using a similar solution) is started [2]. This is further evidence of the effectiveness of this intervention and of the necessity of its prompt initiation.

Pharmacological interventions may provide additional benefit. Glutamic acid has been shown to be effective in ameliorating some of the peripheral neurotoxicities associated with vincristine [3], and was also used in the case of the only other known survivor of intrathecally administered vincristine [4].

Folinic acid may be useful, although, as we pointed out in our review, the evidence for this is scanty. One child who received intrathecal vincristine was reported to have had a transient recovery of deep tendon reflexes [5]. However, other investigators have not been able to show

any benefit in treating vincristine-associated neurotoxicities with either folinic acid [6] or pyridoxine [7].

Finally, we concur with Dr. Walter's comments about prevention and the specific measures he has proposed. While aggressive and timely rescue is likely to be life-saving, drug removal in this situation is a highly invasive technique with its own risks to the patient, and residual neurotoxicities should be anticipated. Prevention remains the primary "rescue."

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